

## WHAT IS CLAIMED IS:

- 1        1. A computer implemented method of clipping a subject  
2 polygon by a clip polygon and forming trapezoids filling the  
3 clipped area comprising the steps of:
  - 4            (1) representing the subject polygon and the clip polygon  
5 each as a set of edges, each edge represented by minimum Y  
6 coordinate, a minimum X coordinate, a maximum Y coordinate and  
7 a slope;
  - 8            (2) sorting said subject polygon set of edges and said  
9 clip polygon set of edges in increasing values of minimum Y  
10 coordinate and storing said sorted set of edges as an array of  
11 edges;
  - 12           (3) determining the greatest minimum Y coordinate of a  
13 first edge entry in said subject polygon set of edges and a  
14 first edge entry in said clip polygon set of edges, thereby  
15 determining a bottom Y coordinate of a next trapezoid to be  
16 formed;
  - 17           (4) detecting all intersections between edges;
  - 18           (5) forming trapezoids for all areas within both said  
19 subject polygon and said clip polygon between successive pairs  
20 in the direction perpendicular to the scan line dimension of  
21 all edge ends and edge intersections between said greatest  
22 minimum Y coordinate of said subject polygon edges and said  
23 clip polygon edges and a smallest maximum Y coordinate of said  
24 subject polygon and said clip polygon edges.
- 1        2. A computer implemented method of rasterizing a page  
2 in a page description language in a multiprocessor integrated  
3 circuit comprising the steps of:

4        interpreting said page in said page description language  
5        with a first processor of said multiprocessor integrated  
6        circuit;

7        spawning a subtask from said first processor to another  
8        of said processors for sorting polygon edges in increasing  
9        minimum Y coordinate.

1        3. The computer implemented method of claim 4, wherein:  
2        said first processor is a reduced instruction set  
3        processor having a floating point computation unit; and  
4        each of said other processors is a digital signal  
5        processor having an integer multiplier unit.

1        4. The computer implemented method of claim 5, further  
2        comprising:

3        spawning a subtask from said first processor to another  
4        of said processors for detecting a Y coordinate of edge  
5        intersection via successive midpoint approximation.

1        5. The computer implemented method of claim 5, further  
2        comprising:

3        calculating a Y coordinate of edge intersection employing  
4        said floating point calculation unit of said first processor.

1        6. A printer comprising:

2        a transceiver adapted for bidirectional communication  
3        with a communications channel;

4        a memory;

5        a print engine adapted for placing color dots on a  
6        printed page according to received image data and control  
7        signals; and

8       a programmable data processor connected to said  
9 transceiver, said memory and said print engine, said  
10 programmable data processor programmed to  
11       receive print data corresponding to pages to be  
12       printed from the communications channel via said  
13       transceiver;  
14       convert said print data into image data and control  
15       signals for supply to said print engine for printing a  
16       corresponding page, said conversion including clipping a  
17       subject polygon by a clip polygon and forming trapezoids  
18       filling the clipped area by:  
19       representing the subject polygon and the clip  
20       polygon each as a set of edges, each edge  
21       represented by minimum Y coordinate, a minimum X  
22       coordinate, a maximum Y coordinate and a slope,  
23       sorting said subject polygon set of edges and  
24       said clip polygon set of edges in increasing values  
25       of minimum Y coordinate and storing said sorted set  
26       of edges as an array of edges,  
27       determining the greatest minimum Y coordinate  
28       of a first edge entry in said subject polygon set  
29       of edges and a first edge entry in said clip  
30       polygon set of edges, thereby determining a bottom  
31       Y coordinate of a next trapezoid to be formed,  
32       detecting all intersections between edges,  
33       forming trapezoids for all areas within both  
34       said subject polygon and said clip polygon between  
35       successive pairs in the direction perpendicular to  
36       the scan line dimension of all edge ends and edge  
37       intersections between said greatest minimum Y  
38       coordinate of said subject polygon edges and said  
39       clip polygon edges and a smallest maximum Y

40 coordinate of said subject polygon and said clip  
41 polygon edges; and  
42 controlling said print engine according to said  
43 image data and control signals to print a corresponding  
44 page.

1 7. A printer comprising:  
2 a transceiver adapted for bidirectional communication  
3 with a communications channel;  
4 a memory;  
5 a print engine adapted for placing color dots on a  
6 printed page according to received image data and control  
7 signals; and  
8 a multiprocessor integrated circuit connected to said  
9 transceiver, said memory and said print engine, said  
10 multiprocessor integrated circuit including a plurality of  
11 data processors collectively programmed to  
12 receive print data corresponding to pages to be  
13 printed from the communications channel via said  
14 transceiver;  
15 convert said print data into image data and control  
16 signals for supply to said print engine for printing a  
17 corresponding page, said conversion including rasterizing  
18 a page in a page description language by:  
19 interpreting said page in said page  
20 description language with a first data processor of  
21 said multiprocessor integrated circuit,  
22 spawning a subtask from said first data  
23 processor to another of said plurality of data  
24 processors for sorting polygon edges in increasing  
25 minimum Y coordinate; and

26               controlling said print engine according to said  
27       image data and control signals to print a corresponding  
28       page.

1       8. The printer of claim 7, wherein:  
2       said first data processor of said multiprocessor  
3       integrated circuit is a reduced instruction set processor  
4       having a floating point computation unit; and  
5       each of said other data processors of said multiprocessor  
6       integrated circuit is a digital signal processor having an  
7       integer multiplier unit.

1       9. The printer claim 8, wherein:  
2       said multiprocessor integrated circuit is further  
3       collectively programmed to spawn a subtask from said first  
4       data processor to another of said plurality of data processors  
5       for detecting a Y coordinate of edge intersection via  
6       successive midpoint approximation.

1       10. The printer of claim 8, wherein:  
2       said multiprocessor integrated circuit is further  
3       collectively programmed to calculate a Y coordinate of edge  
4       intersection employing said floating point calculation unit of  
5       said first data processor.